



Think small



Mining is big business. For many commodities, the orebodies are big and the best way to exploit them for maximum profit is on a large scale.

But do large mines mean large equipment? At the moment, the answer is yes. Ramps can only handle a limited number of trucks per day and removing that obstacle is very expensive; more or wider ramps, a larger pit to hold them, and a lower extraction ratio. We deal with the problem of optimising ramps by making our trucks as large as possible.

This also means we can manage with fewer drivers and, as is common knowledge, drivers are an ongoing expense.

If we look at air travel, we have seen the same move to larger equipment over time. A route like Johannesburg to London is like a ramp. It cannot take many more aircraft than it already does, because airports are constrained to accept a limited number of aircraft per day. The limit is safety; aircraft cannot land more frequently because of fear of collision. The result is a long-term trend to larger and more fuel-efficient aircraft.

But aviation is changing. We are seeing developments in local flight like the Lilium air-taxi: electric power and vertical take-off enables quiet 'air taxis' that can fly directly from your house to the nearby airport, from where you can catch a plane to anywhere.

For both mine haulage and aircraft, a constraint is a driver. While aviation is becoming steadily more automated, it is unlikely that we will see pilotless planes for a while yet, more because we cannot stomach the idea of a computer flying the plane in which we sit than because it is going to be less safe. For mine haulage, we already have automated trucks, and their safety record is better than that of human-driven trucks.

In mining, it is unlikely that anyone is going to switch to many small trucks in a large operation, although there is evidence that their flexibility might make them a more cost-effective option. But then again, automating small trucks in a small operation makes sense. For example, a planned mine nearby can only work during the day, due to concerns about noise from its neighbours. In their application, a small, autonomous electric haul truck would be able to operate at night because it is silent, and in this case, would travel downhill loaded and uphill empty, and subsequently may be able to achieve its task without consuming any diesel.

With time, perhaps we will see many smaller trucks in large pits, rather than a few larger trucks, running on electricity rather than diesel, respectively. If we are serious about geometallurgy, we need to handle ore in smaller packages, and just the improvement in grade control could make the switch possible. With the widespread introduction of renewable energy, it also allows mines to lower their diesel bills and be seen to be greener.

At a time of tariffs and uncertainty, anything that can reduce risks and lower costs appears good. General automation of the mining fleet is at the point where it can solve problems and make mines at all scales more efficient, and therefore, more viable when prices collapse.

D. Vogt